

I Claim:

1. A method for measuring a winding temperature of a drive motor, which comprises:

feeding current to motor windings of the motor through an inverter, the motor windings having a temperature-dependent resistance;

measuring, through the inverter, a current flow through at least one of the motor windings with at least approximate knowledge of a cold resistance and other parameters of the motor;

calculating a change in temperature of the motor windings from a change in the current flow resulting from a change in the temperature-dependent resistance; and

measuring one of:

a rise time of the current until at least one reference value is reached; and

a current rise during a fixed time interval.

2. The method according to claim 1, which further comprises carrying out the measuring step when the motor is stationary.

3. The method according to claim 1, which further comprises carrying out the measuring step simultaneously through two windings of the motor.

4. The method according to claim 2, which further comprises carrying out the measuring step simultaneously through two windings of the motor.

5. The method according to claim 1, which further comprises carrying out the measuring step to determine any relative discrepancy.

6. The method according to claim 1, which further comprises storing measurement results of previous measurements.

7. The method according to claim 1, which further comprises passing an acknowledgement to a motor controller to reduce operating phases of the motor.

8. The method according to claim 7, which further comprises initiating a signal to a user from a motor controller.

9. The method according to claim 8, which further comprises carrying out the initiating step by initiating at least one of a visual signal and an audible signal.

10. A method for measuring a winding temperature of a drive motor, which comprises:

providing the drive motor with three winding sections, the motor windings having a temperature-dependent resistance;

providing an inverter with three controlled half bridges;

feeding current from a DC voltage intermediate circuit through an inverter to the motor windings;

measuring, through the inverter, a current flow through at least one of the motor windings with at least approximate knowledge of a cold resistance and other parameters of the motor;

calculating a change in temperature of the motor windings from a change in the current flow resulting from a change in the temperature-dependent resistance; and

measuring one of:

a rise time of the current until at least one reference value is reached; and

a current rise during a fixed time interval.

11. An apparatus for measuring a winding temperature of a drive motor having motor windings, the motor windings having a temperature-dependent resistance, comprising:

an inverter for feeding current to the motor windings;

a current measurement device;

a voltage measurement device;

a computation unit connected to said current measurement device and to said voltage measurement device for determining an instantaneous resistance of the motor windings, said computation unit being programmed to determine one of a temperature change and a temperature of the windings based upon one of the instantaneous resistance and an instantaneous change in the temperature-dependent resistance; and

at least one of:

at least one threshold value comparator and one time measurement apparatus; and

said current measurement device measuring in a defined time interval and for passing on an analog or a digital signal to an evaluation device.

12. The apparatus according to claim 11, further comprising a microcontroller, said computation unit being part of said microcontroller.

13. The apparatus according to claim 11, wherein said computation unit is part of a microcontroller.

14. The apparatus according to claim 12, wherein said threshold value comparator and said time measurement apparatus are part of said microcontroller.

15. The apparatus according to claim 12, wherein the evaluation device is said computation unit and is part of said microcontroller.

16. The apparatus according to claim 12, wherein the evaluation device is a computation unit and is part of said microcontroller.

17. The apparatus according to claim 12, further comprising:

two threshold value comparators for monitoring two current thresholds;

one of said current thresholds being above a control current limit of a pulse width modulation for controlling circuit breakers for one of a converter and said inverter;

a value of said first threshold being approximately 60% of that of said second threshold; and

one of said microcontroller and a downstream control unit being programmed to immediately initiate emergency disconnection of the motor 1 upon reading said second threshold.

18. An apparatus for measuring a winding temperature of a three-phase drive motor having motor windings, the motor windings having a temperature-dependent resistance, an inverter having three controlled half bridges feeding current to the motor windings from a DC voltage intermediate circuit, comprising:

a current measurement device;

a voltage measurement device;

a computation unit connected to said current measurement device and to said voltage measurement device for determining an instantaneous resistance of the motor windings, said computation unit being programmed to determine one of a temperature change and a temperature of the windings based upon one of the instantaneous resistance and an instantaneous change in the temperature-dependent resistance; and

at least one of:

at least one threshold value comparator and one time measurement apparatus; and

said current measurement device measuring in a defined time interval and for passing on an analog or a digital signal to an evaluation device.

19. In a motor system including DC voltage intermediate circuit, a three-phase drive motor with motor windings, the motor windings having a temperature-dependent resistance, and an inverter having three controlled half bridges feeding current to the motor windings from the intermediate circuit, a winding temperature measuring apparatus comprising:

a current measurement device;

a voltage measurement device;

a computation unit connected to said current measurement device and to said voltage measurement device for determining an instantaneous resistance of the motor windings, said computation unit being programmed to determine one of a temperature change and a temperature of the windings based upon one of the instantaneous resistance and an instantaneous change in the temperature-dependent resistance; and

at least one of:

at least one threshold value comparator and one time measurement apparatus; and

said current measurement device measuring in a defined time interval and for passing on an analog or a digital signal to an evaluation device.

20. A household appliance, comprising:

a drive motor having motor windings, said motor windings having a temperature-dependent resistance;

an inverter for feeding current to said motor windings;



an control system for measuring a winding temperature of said drive motor, said apparatus having:

a current measurement device measuring, through said inverter, a current flow through at least one of said motor windings with at least approximate knowledge of a cold resistance and other parameters of said motor, said current measurement device measuring one of:

a rise time of the current until at least one reference value is reached; and

a current rise during a fixed time interval;

a voltage measurement device;

a computation unit connected to said current measurement device and to said voltage measurement device for determining an instantaneous resistance of said motor windings, said computation unit being programmed to determine one of a temperature change and a temperature of said windings based upon one of the instantaneous resistance and an instantaneous change in the temperature-dependent resistance and to calculate a change in temperature of the motor windings from a change

in the current flow resulting from a change in the temperature-dependent resistance; and

at least one of:

at least one threshold value comparator and one time measurement apparatus; and

said current measurement device measuring in a defined time interval and for passing on an analog or a digital signal to an evaluation device.